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SUBSTRATE GEOMETRY FOR THREE DIMENSIONAL PHOTOVOLTAICS FABRICATION [NIST Docket No. 11-023]

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Abstract

A thin film photovoltaic device with back contacts is disclosed. The thin film photovoltaic device may comprise 1) a first contact disposed in a first layer and having an upper surface and a lower surface; 2) a first semiconductor disposed in a second layer and having a lower surface disposed on the upper surface of the first contact; 3) an insulator or second semiconductor disposed in a third layer and on an upper surface of the first semiconductor; 4) a second contact disposed in a fourth layer and on the insulator or second semiconductor; and 5) an absorber disposed in a fifth layer and about the second contact. The absorber may comprise a p-type or a n-type semiconductor and the first semiconductor may comprise the other of the p-type and n-type semiconductor. The second contact may be patterned.

Properties of the presently disclosed photovoltaic device may be dependent on the geometry of one or more layers. Therefore, lithography may be used to control the geometry of one or more layers. A nonplanar surface topography of one or more layers, the outer layer of the absorber for example, may improve efficiency. The performance of the photovoltaic device of the present disclosure may not be restricted by transparency and conductivity tradeoffs, as with conducting transparent oxides (CTO) and window layers, since there may be no CTO layer in the presently disclosed photovoltaic device. Aspects of the present disclosure may not require precise or high quality lithography since the electrodes are in different layers separated by at least one semiconductor layer, avoiding the shorting of adjacent +/- electrodes. This may permit inexpensive, lower quality patterning of layers that may be patterned. ;

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References

- 11-023Application

Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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